REMARKS/ARGUMENTS

In the Office Action, the Examiner noted that claims 1-45 are pending in the application. The Examiner additionally stated that claims 1-45 are rejected. By this amendment, claims 1, 9, 16, 23, 27, and 30 have been amended. Hence, claims 1-45 are pending in the application.

Applicant hereby requests further examination and reconsideration of the application, in view of the foregoing amendments.

In the Specification

Applicant has amended the specification to secure a substantial correspondence between the claims amended herein and the remainder of the specification. No new matter is presented.

37 CFR 1.131 Affidavit

The Examiner noted that the Affidavit filed on 9/29/04 under 37 CFR 1.131 has been considered but is ineffective to overcome the Beukema reference because, among other reasons, the Examiner applied a new reference in addition to the original set of claim rejections.

Rather than provide evidence that would antedate Beukema, Applicant has chosen to traverse the rejections for which Beukema is applied and will provide arguments hereinbelow.

In the Claims

Rejections Under 35 U.S.C. §102(e) - Susnow

The Examiner rejected claims 1-5, 9-12, 16-19, 23, 26, 27, and 30-33 under 35 U.S.C. 102(e) as being anticipated by Susnow et al., US 6,751,235 (hereinafter, Susnow). Applicant respectfully traverses the Examiner's rejections.

Prior to providing a claim-by-claim analysis, an overview of the teachings of Susnow is now provided to aid the Examiner in his reconsideration of the rejections.

Susnow teaches a technique for synchronizing a communication link by a network interface having a transmitter in a core clock domain that is different from the link clock

domain of the communication link (Abstract). With regard to application of his invention, Susnow states that it is applicable for use with all types of computer networks including designs which link together disparate processing systems. Of the examples of such networks, Susnow includes NGIO and Infiniband (col. 2, lines 40-52). With particular reference to configuration of a host processing system 330 according to his invention, Susnow introduces a fabric channel adapter 339 that is connected between the I/O and memory controller 333 and the network switching fabric 100. Susnow states that the channel adapter 339 (339' if it is connected to a PCI bus) may have therein a software stack to access the network fabric 100 and information about fabric configuration, fabric topology, and connection information. Although not shown, Susnow notes that an operating system within the host 330 performs common functions such as sending and receiving I/O transaction messages and remote direct memory access operations (col. 3, line 67- col. 4, line 42). Although Susnow teaches the architecture of a typical present day computer network in the noted paragraphs, the problem that he notes and which he addresses is synchronization of physical layer communication links between a core clock domain and a link clock domain, as discussed with reference to figures 7-9.

In contrast, Applicant's invention is directed toward techniques that allow servers to offload TCP/IP-related processing, where the server is connected to plurality of clients, and the plurality of clients are accessed via a TCP/IP network . TCP/IP connections between the plurality of clients and the server are accelerated. The apparatus includes an accelerated connection processor and a target channel adapter. The accelerated connection processor bridges TCP/IP transactions between the plurality of clients and the server, where the accelerated connection processor accelerates the TCP/IP connections by prescribing remote direct memory access operations to retrieve/provide transaction data from/to the server. The target channel adapter is coupled to the accelerated connection processor. The target channel adapter executes the remote direct memory access operations to retrieve/provide the transaction data. The TCP/IP transactions are accelerated by offloading TCP/IP processing otherwise performed by the servers to retrieve/provide transaction data.

Although Susnow's host system is capable of performing remote direct memory access operations, nowhere within the specified reference does he suggest acceleration of a TCP/IP connection by prescribing remote direct memory access operations, where TCP/IP transactions are accelerated by offloading TCP/IP processing otherwise performed by servers to retrieve/provide transaction data. Susnow does not even identify TCP/IP processing in a server as a problem to be solved. This is because Susnow is concerned with synchronizing physical layer communications over a disparate computer network.

Claim 1, as amended, is provided below for ease of reference.

1. A TCP-aware target adapter, for accelerating TCP/IP connections between a plurality of clients and a plurality of servers, the plurality of servers being accessed via an Infiniband fabric, the plurality of clients being accessed via a TCP/IP network, the TCP-aware target adapter comprising:

an accelerated connection processor, configured to bridge TCP/IP transactions between the plurality of clients and the plurality of servers, wherein said accelerated connection processor accelerates the TCP/IP connections by prescribing remote direct memory access operations to retrieve/provide transaction data from/to the plurality of servers; and

a target channel adapter, coupled to said accelerated connection processor, configured to support Infiniband operations with the plurality of servers, and configured to execute said remote direct memory access operations to retrieve/provide said transaction data;

whereby the TCP/IP connections are accelerated by offloading TCP/IP processing otherwise performed by the plurality of servers to retrieve/provide said transaction data.

In rejection of claim 1, the Examiner states that Susnow teaches an apparatus, for accelerating TCP/IP connections between a plurality of clients and a plurality if servers, the plurality of servers being accessed via an Infiniband fabric, the plurality of clients being accessed via a TCP/IP network, the apparatus comprising: an accelerated

connection processor, configured to bridge TCP/IP transactions between the plurality of clients and the plurality of servers, wherein said accelerated connection processor accelerates the TCP/IP connections by prescribing remote direct memory access operations to retrieve/provide transaction data from/to the plurality of servers; and a target channel adapter, coupled to said accelerated connection processor, configured to execute said remote direct memory access operations to retrieve/provide said transaction data.

Applicant respectfully disagrees with the Examiner's characterization of the teachings of Susnow for the following reasons. First, Susnow does not teach, or even suggest, that TCP/IP connections between a plurality of clients and a server can be accelerated by prescribing remote direct memory access operations. Although he does discuss using VI, circuitry of which is provided within a virtual expansion bridge 670 in his invention, it is taught that the function of the bridge 670 is to transition data from an NGIO or Infiniband host channel adapter therein to the memory controller hub 620 (col. 6, lines 18-20). Susnow teaches that the VI architecture, while providing high reliability, does not specify the implementation of certain transport level functions to include flow control, buffer management, segmentation and reassembly, *and link synchronization*, the problem noted and addressed by the noted reference. Thus, it follows that Susnow teaches utilizing an NGIO or Infiniband fabric to execute VI transactions between his host system 330 and other devices as noted in Figure 3. In fact, it is the particular employment of VI that creates the very link synchronization problem which is pointed out by Susnow. Furthermore, Applicant respectfully disagrees with both the Examiner's and Susnow's characterization of the VI architecture as being a modified version of TCP/IP. More specifically, the VI Architecture Specification cited by Susnow (col. 6, lines 42-48) does not specify a particular implementation of transport, network, or link layers. A VI configuration can be implemented without employing TCP/IP. And consequently, because no underlying layers are specified, VI cannot be characterized as a modified or improved version of TCP/IP.

But nowhere does Susnow teach that a TCP/IP connection (or a VI connection, for that matter) can be accelerated through the employment of remote direct memory access

operations, whereby the TCP/IP connections are accelerated by offloading TCP/IP processing otherwise performed by the plurality of servers to retrieve/provide said transaction data. Applicant has studied the teachings of Susnow and finds that he utterly fails to teach, suggest, allude to, or even hint that one skilled in the art would be motivated to accelerate a TCP/IP connection by prescribing remote direct memory access operations to send/receive transaction data.

For these reasons, it is respectfully requested that the rejection of claim 1 be withdrawn.

With respect to claims 2-5, these claims depend from claim 1 and add further limitations that are neither anticipated nor made obvious by Susnow. Accordingly, Applicant respectfully requests that the Examiner withdraw his rejections to claims 2-5 as well.

Claim 9 is provided below for ease of reference.

9. An apparatus in a server connected to an Infiniband fabric for implementing accelerated TCP/IP connections between the server and clients, the clients being connected to a TCP/IP network, the apparatus comprising:

a connection acceleration driver, configured to manage the accelerated TCP/IP connections, wherein said connection acceleration driver designates memory locations within server memory such that transaction data can be retrieved/provided via Infiniband remote direct memory access operations; and

a host channel adapter, coupled to said connection acceleration driver, configured to execute Infiniband operations via the Infiniband fabric, and configured to execute direct memory access functions to retrieve/provide said transaction data responsive to said Infiniband remote direct memory access operations;

whereby the accelerated TCP/IP connections offload TCP/IP processing otherwise performed by the server to retrieve/provide said transaction data.

In combination with other elements and limitations, claim 9 recites a connection acceleration driver, configured to manage accelerated TCP/IP connections, where the

connection acceleration driver designates memory locations within server memory such that transaction data can be retrieved/provided via Infiniband remote direct memory access operations; and a host channel adapter, coupled to the connection acceleration driver, configured to execute Infiniband operations via the Infiniband fabric, and configured to execute direct memory access functions to retrieve/provide the transaction data responsive to the Infiniband remote direct memory access operations.

The Examiner stated that claim 9 is rejected for the same reasons as claim 1.

In response, Applicant again asserts that Susnow does not even suggest a connection acceleration driver that manages accelerated TCP/IP connections, where the connection acceleration driver designates memory locations within server memory such that transaction data can be retrieved/provided via Infiniband remote direct memory access operations. In fact, Susnow fails to teach any means whatsoever of accelerating a TCP/IP connection by executing a remote direct memory access operation to receive/transmit transaction data. As noted above in traversal of the rejection of claim 1, Susnow teaches a link synchronization technique that arises from use of NGIO or Infiniband to accomplish VI transactions. Accordingly, Applicant respectfully requests that the rejection of claim 9 be withdrawn.

With respect to claims 10-12, these claims depend from claim 9 and add further limitations that are neither anticipated nor made obvious by Susnow. Accordingly, Applicant respectfully requests that the Examiner withdraw his rejections to claims 10-12 as well.

Claim 16 is recited below for ease of reference.

16. (Currently Amended): An apparatus within a client-server environment for managing an accelerated TCP/IP connection between a server and a client, the client being connected to a TCP/IP network, the apparatus comprising:

a host driver, for providing a work queue through which transaction data corresponding to the accelerated TCP/IP connection is transmitted/received; and

a TCP-aware target adapter, coupled to said host driver, for executing a remote direct memory access operation to receive/transmit said transaction data;

whereby the accelerated TCP/IP connection offloads TCP/IP processing otherwise performed by the server to retrieve/transmit said transaction data.

In combination with other elements and limitations, amended claim 16 recites a host driver, that provides a work queue through which transaction data corresponding to the accelerated TCP/IP connection is transmitted/received and a TCP-aware target adapter that executes a remote direct memory access operation to receive/transmit transaction data.

In his rejection, the Examiner notes that Susnow teaches the above elements and limitations and refers Applicant to col. 2, lines 55-60 and col. 3, lines 44-55. Applicant respectfully suggests that the Examiner has mischaracterized Susnow's teachings because although Susnow recites a host processing system 330 having operating system with a driver therein, he does not teach a host driver, for providing a work queue through which transaction data corresponding to an accelerated TCP/IP connection is transmitted/received. In fact, Susnow does not even suggest a work queue, nor does he suggest any means whatsoever of accelerating a TCP/IP connection by executing a remote direct memory access operation to receive/transmit transaction data. As noted above in disputation of the rejection of claim 1, Susnow teaches a link synchronization technique that arises from use of NGIO or Infiniband to accomplish VI transactions.

For these reasons, Applicant respectfully requests that the Examiner withdraw his rejection of claim 16.

With respect to claims 17-19, these claims depend from claim 16 and add further limitations that are neither anticipated nor made obvious by Susnow. Accordingly, Applicant respectfully requests that the Examiner withdraw his rejections to claims 17-19.

The Examiner rejected claim 23 for the same reasons as stated in the rejections of claims 1 and 6. To respond, Applicant again asserts arguments presented above in traversal of the rejections of claims 1 and 6, and notes that claim 23 recites, in combination with other

elements and limitations, mapping TCP/IP connection parameters for accelerated connections to corresponding host and target work queue pairs; and offloading TCP/IP processing otherwise performed by the servers by executing Infiniband remote direct memory access operations to retrieve/transmit data associated with the accelerated connections from/to memory within the servers. And as noted previously, Applicant finds that Susnow fails to teach any means for accelerating a TCP/IP connection. Thus, it does not follow that he would teach mapping TCP/IP connection parameters for accelerated connections to corresponding host and target work queue pairs; and offloading TCP/IP processing otherwise performed by the servers by executing Infiniband remote direct memory access operations to retrieve/transmit data associated with the accelerated connections from/to memory within the servers. Consequently, Applicant respectfully requests that the rejection of claim 23 be withdrawn.

Claim 26 depends from claim 23 and adds further limitations that are neither anticipated nor made obvious by Susnow. Accordingly, Applicant requests the withdrawal of the rejection of claim 26

The Examiner rejected claim 27 for the same reasons as set forth in his rejections in combination to claims 1-2. In response, Applicant directs the Examiner's attention to arguments provided in disputation of the rejection of claim 1. In particular, is has been noted that although Susnow's host system is taught as providing the capability to performing a remote direct memory access operation (an architectural feature of both Infiniband and NGIO), he is absolutely silent with regard to bypassing a TCP/IP stack otherwise employed in a server by utilizing remote direct memory access operations to directly access data from/to server memory. Furthermore, Susnow does not even identify processing in a server TCP/IP stack as a problem needing attention. This is because Susnow is concerned with synchronizing physical layer communications over a disparate computer network. Consequently, Applicant respectfully requests that the rejection of claim 27 be withdrawn.

Claim 30, in combination, recites a TCP-aware target adapter, for accelerating TCP/IP connections between a plurality of clients and a plurality of servers, the plurality of

clients being accessed via a TCP/IP network, the TCP-aware target adapter comprising: an accelerated connection processor, configured to bridge TCP/IP transactions between the plurality of clients and the plurality of servers, where the accelerated connection processor accelerates the TCP/IP connections by prescribing remote direct memory access operations to retrieve/provide transaction data from/to the plurality of servers; and a target channel adapter, coupled to the accelerated connection processor, configured to execute the remote direct memory access operations to retrieve/provide the transaction data, and configured to route the transaction data to/from the plurality of clients. The TCP/IP connections are accelerated by offloading TCP/IP processing otherwise performed by the server to retrieve/provide the transaction data.. Although in his rejection of claim 30, the Examiner pointed Applicant to the reasons set forth in his rejections of claims 1 and 11, Applicant respectfully asserts that the Examiner does not fully comprehend the teachings of Susnow in the particular case of accelerating a TCP/IP connection, for Susnow fails to even suggest using remote direct memory access operations to retrieve/provide transaction data from/to a server in order to accelerate a given TCP/IP connection. Accordingly, it is requested that the Examiner withdraw his rejection of claim 30.

With respect to claims 31-33, these claims depend from claim 30 and add further limitations that are neither anticipated nor made obvious by Susnow. Accordingly, Applicant respectfully requests that the Examiner withdraw his rejections of claims 31-33.

Rejections Under 35 U.S.C. §103(a)

The Examiner rejected claims 6-8, 13-15, 20-22, 24-25, 28-29, 34-36, and 37-39 under 35 U.S.C. 103(a) as being unpatentable over Susnow in view of Cheriton et al. (hereinafter Cheriton), US 6675200. Applicant respectfully traverses the Examiner's rejections.

With respect to claim 6, the Examiner noted that Cheriton teaches a connection correlator, configured to associate TCP/IP connection parameters with a target work queue number for said each of a plurality of accelerated TCP/IP connections (col. 3, lines

38-45; lines 54-57; and col. 4, lines 37-44). The Examiner further opined that it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Susnow and Cheriton because they both deal with remote memory access systems.

In response, Applicant notes that Cheriton teaches modifying a standard TCP header (see Fig. 1) to provide for an RDMA option, where a sender *must place option bytes in the header of each TCP segment containing RDMA data.* The RDMA option bytes describe the location of the RDMA data in the TCP payload to the receiver, which allows the receiving system to load the RDMA data directly to an application memory without making intermediate copies. Thus, Cheriton teaches a protocol that is embedded within a TCP segment that directs a receiver to execute an RDMA operation that is associated with payload data within that TCP segment. But Cheriton, Susnow, or Cheriton and Susnow in combination do not teach acceleration of a TCP/IP connection by prescribing remote direct memory access operations, where TCP/IP transactions are accelerated by offloading TCP/IP processing otherwise performed by the server to retrieve/provide transaction data. Furthermore neither of these references, alone or in combination, provide any teaching whatsoever on a connection correlator that is configured to associate TCP/IP connection parameters with a target work queue number for each of a plurality of accelerated TCP/IP connections. Both Cheriton and Susnow fail to even note the concept of a work queue, or of any apparatus or method whereby a particular work queue is associated with TCP/IP connection parameters. Moreover, since arguments in traversal of the rejection of claim 1 have been presented showing that Susnow does not anticipate claim 1, it is improper to suggest combining the teachings of Susnow and Cheriton to make obvious that recited by claim 6.

Accordingly, Applicant respectfully requests withdrawal of the rejection of claim 6.

With respect to claims 7-8, these claims depend from claim 1 and adds further limitations that are neither anticipated nor made obvious by Susnow, Cheriton, or Susnow and Cheriton in combination. Accordingly, Applicant respectfully requests that the Examiner withdraw his rejections of claims 7-8.

The Examiner rejected claims 13-15 for the same reasons as set forth in his rejection of claims 6-8. Applicant responds by directing the Examiner's attention to arguments set forth in traversal of the rejections of claim 6-8 and requests, based on the provided arguments, that the rejection of claims 13-15 be withdrawn.

The Examiner rejected claims 20-22 for the same reasons as set forth in his rejections of claims 6-7. Applicant responds by directing the Examiner's attention to arguments set forth in traversal of the rejections of claim 6-7 and requests, based on the provided arguments, that the rejections of claim 20-22 be withdrawn.

With respect to claim 24, the Examiner noted that Susnow teaches the method as recited in claim 23, and furthermore that Cheriton teaches intercepting the TCP/IP connection parameters from requests to send/receive data from the servers (col. 3, lines 38-45). The Examiner concluded that it would have been obvious to one of ordinary skill in the art at the time of invention to combine the teaching of Susnow and Cheriton because they both deal with remote memory access systems.

Applicant respectfully traverses and notes again, as in arguments provided in traversal of the rejection of claim 23, that Susnow does not provide any motivation whatsoever that would lead one skilled in the art to even consider accelerating a TCP/IP connection, and much less so to accomplish such acceleration by performing remote direct memory access operations. This is because Susnow's patent teaches how to synchronize links under differing clock domains. Accordingly, Applicant respectfully requests that the rejection of claim 24 be withdrawn.

Like claim 24, claim 25 depends from claim 23 and adds further limitations that are neither anticipated nor made obvious by Susnow, Cheriton, or Susnow and Cheriton in combination. Accordingly, Applicant respectfully requests that the Examiner withdraw his rejection of claim 25.

The Examiner rejected claims 28-29 for the same reasons as set forth in his rejection of claim 6. Applicant responds by directing the Examiner's attention to arguments set forth in traversal of the rejections of claim 6 and requests, based on the provided arguments, that the rejections of claims28-29 be withdrawn.

The Examiner rejected claims 34-35 for the same reasons as set forth in his rejection of claim 7. Applicant responds by directing the Examiner's attention to arguments set forth in traversal of the rejections of claims 6 and 7 and requests, based on the provided arguments, that the rejections of claims 34-35 be withdrawn.

The Examiner rejected claim 37 for the same reasons as set forth in his rejection of claim 6. In addition the Examiner noted that the claim states "unaccelerated," and further opines that it is the Infiniband fabric that is really accelerating the TCP/IP connections by transferring TCP packets on the Infiniband fabric. The Examiner states that claim 6 lwith combination of Sunow's system teaches this claim.

Applicant responds by directing the Examiner's attention to arguments set forth in traversal of the rejections of claim 6 and furthermore notes that in the specification "accelerated" and "unaccelerated" connections are distinguished as follows:

For unaccelerated client-server connections, the connection acceleration driver 417 allows TCP/IP commands from an application program to be processed by the server's TCP/IP stack. At the bottom of the stack, the driver 417 retrieves the resulting native frame data according to the operating system's network driver interface (NDI). The connection acceleration driver 417 then generates and provides IBA transaction requests to the HCA 418 resulting in the transmission of IBA packets to the TCP-aware target adapter 430. The payload of the IBA packets contain the native network frame data that was retrieved via the NDI for transmission to a designated client 442. The TCP-aware target adapter 430 receives the IBA packets from the IBA fabric 406 and generates native network frames over the client LAN 440 to a designated client 442. For native TCP/IP transactions from the designated client 442 to the server 410, the TCP-aware target adapter 430 receives the native frames and embeds native frame data into IBA packets which are transmitted over the fabric 406 to the HCA 418 within the server 410. The connection acceleration driver 417 retrieves the native frames data and provides it to the server's TCP/IP stack at the NDI.

In one embodiment, an unaccelerated client-server connection is a TCP/IP connection that has not yet been established and accelerated or it is an established and accelerated

connection that is in the process of graceful termination. Established client-server connections are accelerated in order to move message data between clients 442 and servers 410, thereby offloading host TCP/IP processing. Unaccelerated connections are employed to gracefully establish and terminate TCP/IP sessions between clients 442 and servers 410.

Based on the above section of the specification, Applicant respectfully requests that the Examiner note that a connection is not "accelerated" simply because data is being transferred via the Infiniband fabric. It is accelerated because processing associated with a server's TCP/IP stack is bypassed. Accordingly, it is respectfully requested that the rejection of claim 37 be withdrawn.

With respect to claims 38-39, these claims depend from claim 37 and add further limitations that are neither anticipated nor made obvious by Susnow, Cheriton, or Susnow and Cheriton in combination. Accordingly, Applicant respectfully requests that the Examiner withdraw his rejections of claims 38-39.

The Examiner rejected claims 40-45 under 35 U.S.C. 103(a) as being unpatentable over Susnow, in view of Johnson U.S. Patent No. 6,591,310. Applicant respectfully traverses.

Claim 40 is repeated below for ease of reference.

40. An Infiniband-to-native protocol translation apparatus, for routing TCP/IP transactions between a plurality of clients and a plurality of Infiniband devices, the plurality of Infiniband devices being accessed via an Infiniband fabric, the plurality of clients being accessed via a TCP/IP network, the Infiniband-to-native protocol translation apparatus comprising:

an unaccelerated connection processor, configured to bridge the TCP/IP transactions between the plurality of clients and the plurality of Infiniband devices by encapsulating/stripping the TCP transactions within/from Infiniband raw packets, said unaccelerated connection processor comprising:

an unaccelerated connection correlator, for mapping native addresses to/from Infiniband local indentifiers and work queue numbers; and

a target channel adapter, coupled to said unaccelerated connection processor, configured to receive/transmit said Infiniband raw packets from/to the plurality of Infiniband devices.

In his rejection, the Examiner noted that Susnow teaches an Infiniband-to-native protocol translation apparatus, for routing TCP/IP transactions between a plurality of clients and a plurality of Infiniband devices, the plurality of Infiniband devices being accessed via an Infiniband fabric, the plurality of clients being accessed via a TCP/IP network, the Infiniband-to-native protocol translation apparatus comprising: an unaccelerated connection processor, configured to bridge the TCP/IP transactions between the plurality of clients and the plurality of Infiniband devices by encapsulating/stripping the TCP transactions within/from Infiniband raw packets, said unaccelerated connection processor comprising: a target channel adapter, coupled to said unaccelerated connection processor, configured to receive/transmit said Infiniband raw packets from/to the plurality of Infiniband devices.

The Examiner furthermore noted that Johnson teaches an unaccelerated connection correlator, for mapping native addresses to/from Infiniband local indentifiers and work queue numbers. The Examiner concluded that it would have been obvious to one of ordinary skill in the art at the time of invention to combine the teachings of Susnow and Johnson because they both deal with improving system I/O speeds.

Applicant respectfully disagrees with the Examiner's characterization of the teachings of Johnson and associated reasons given for combining the teachings of Susnow and Johnson. First, Johnson teaches a method of responding over an I/O message passing medium, to a request message and to provide an associated reply descriptor for transmission over an I/O message passing medium in response to a corresponding request message.. A reply message need only be generated if at least one predefined condition is not met. The reply descriptor includes at least one indication field that identifies its type and a content field, whereby the content field comprises information of the reply

message's storage location (in the event so generated) (col. 5, lines 12-22). In an embodiment directed towards improvement of SCSI communications, a general context reply descriptor is presented in Fig. 3B and discussed. In Figs. 3E-3F, more general embodiments of his reply descriptor are illustrated and discussed. Yet in each of the cases, Johnson's discussion of the corresponding fields lead one skilled in the art to conclude that such construction of a protocol is for primary employment for the transfer of I/O data, as in SCSI, or Fiber Channel devices. Nowhere therein does Johnson provide any motivation or suggestion to provide an unaccelerated connection correlator, for mapping native addresses to/from Infiniband local indentifiers and work queue numbers in the context of routing TCP/IP transactions between a plurality of clients and a plurality of Infiniband devices where TCP/IP transactions between the plurality of clients and the plurality of Infiniband devices are bridged by encapsulating/stripping the TCP transactions within/from Infiniband raw packets.

In addition, Applicant respectfully asserts that it is improper to conclude that one skilled in the art would be led to combine the teachings of Susnow and Johnson to yield the elements recited in claim 40 because Susnow does not teach how to route TCP/IP transactions between a plurality of clients and a plurality of Infiniband devices. Susnow teaches a link synchronization technique that is provided to overcome deficiencies in VI, to wit, VI does not provide for link synchronization.

Accordingly, Applicant respectfully requests that the rejection of claim 40 be withdrawn.

With respect to claims 41-45, these claims depend from claim 40 and add further limitations that are neither anticipated nor made obvious by Susnow, Johnson, or Susnow and Johnson in combination. Accordingly, Applicant respectfully requests that the Examiner withdraw his rejections of claims 41-45.

Rejections Under 35 U.S.C. §102(e) - Beukema

The Examiner rejected claims 1-6, 8-13, 15-21, 23-34, 37, 40, and 43-45 under 35 U.S.C. 102(e) as being anticipated by Beukema et al., US 2002/0073257 (hereinafter, Beukema). Applicant respectfully traverses the Examiner's rejections.

To summarize the teachings of Beukema, a method, system, and apparatus are provided for processing foreign protocol requests such as PCI transactions, across a system area network (SAN) utilizing a data packet protocol while maintaining the other SAN traffic. In one embodiment, an HCA receives a request for a load or store operation from a processor to an I/O adaptor using a protocol with is foreign to the system area network, such as the PCI bus protocol. The HCA encapsulates the request into a data packet and places appropriate headers and trailers into the data packet to ensure that the data packet is delivered across the SAN fabric to an appropriate TCA. The TCA receives the packet, determines that it contains a foreign protocol request, and decodes the packet to obtain the request. The request is then transmitted to the appropriate I/O adapter. In the other direction, DMA and interrupt traffic from the I/O adaptor to the system is received by the TCA using a foreign protocol. The TCA encapsulates the request into a data packet and places the appropriate headers and trailers in the data packet to ensure that the data packet is delivered across the SAN fabric to the appropriate HCA. The HCA receives the data packet, determines that it contains a foreign protocol request, and decodes the data packet to obtain the foreign protocol request, and converts the request to the appropriate host transaction.

Clearly, Beukema teaches a technique for communicating PCI transactions over an Infiniband fabric to a TCA that provides for communicating with PCI devices. Applicant will not belabor arguments presented hereinabove in traversal of claim rejections to which Susnow was applied, but fundamental elements and limitations according to Applicant's invention are missing from Beukema as well. These include, but are not limited to: 1) acceleration of a TCP/IP connection through the employment of remote direct memory access operations, 2) a correlation technique for associating TCP/IP connection parameters for the accelerated connection with target work queues, and 3) offloading TCP/IP processing otherwise performed by servers to retrieve/provide transaction data. All of these aspects of Applicant's invention are absent from the teachings of Beukema.

Accordingly, it is respectfully requested that the rejections of claims 1-6, 8-13, 15-21, 23-34, 37, 40, and 43-45 be withdrawn.

Rejections Under 35 U.S.C. §103(a) - Beukema

The Examiner rejected claims 7, 14, 22, 35-36, 38-39, and 41-42 under 35 U.S.C. 103(a) as being unpatentable over Beukema, in view of "Official Notice." Applicant respectfully traverses the Examiner's rejections and notes that since Beukema does not teach the following elements and limitations:

1) acceleration of a TCP/IP connection through the employment of remote direct memory access operations, 2) a correlation technique for associating TCP/IP connection parameters for the accelerated connection with target work queues, and 3) offloading TCP/IP processing otherwise performed by servers to retrieve/provide transaction data;

that it is improper to conclude that Beukema would suggest or motivate one skilled in the art to provide additional elements and limitations beyond those noted above as recited in claims 7, 14, 22, 35-36, 38-39, and 41-42. Consequently, it is respectfully requested that the rejections of claims 7, 14, 22, 35-36, 38-39, and 41-42 be withdrawn.

CONCLUSIONS

In view of the arguments advanced above, Applicant respectfully submits that claims 1-45 are in condition for allowance. Reconsideration of the rejections is requested, and allowance of the claims is solicited.

Applicant earnestly requests that the Examiner contact the undersigned practitioner by telephone if the Examiner has any questions or suggestions concerning this amendment, the application, or allowance of any claims thereof.

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DATE OF DEPOSIT: **4/19/05**
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Respectfully submitted,
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